Performance Report on Surface Streets in the Seattle Central Business District

Volume 1: Baseline Conditions

September 2, 2005

As required by the Agreement between King County, City of Seattle and Sound Transit, as revised June 24, 2002, for the Downtown Seattle Transit Tunnel and Related Facilities.

Prepared by the Monitor and Maintain Committee, with representation from the following agencies:

City of Seattle

King County

SoundTransit

communitytransit

Pierce Transit

Table of Contents

Table of Figures

Report Purpose

This report, and subsequent updates, is intended to provide the documentation necessary to satisfy the requirements of Section 10.3 of the "Agreement Regarding the Design, Construction and Operation of the Downtown Seattle Transit Tunnel and Related Facilities", as executed by the City of Seattle, King County and Sound Transit.

Excerpts from Section 10.3 of this Agreement read as follows:

> "It is the Parties' intent that the Downtown Seattle Traffic and Street Improvements will be sufficient to maintain bus service performance on surface streets in downtown Seattle, during the closure period and after the tunnel is re-opened at performance levels similar to those existing prior to the Closure Period. The Parties hereby establish a Monitor and Maintain Committee (M&M Committee) to be comprised of the designated contacts set forth in Section 20.0. The M&M Committee may be expanded to include participation by other public agencies at the discretion of the Parties. The M&M Committee shall conduct baseline studies of bus travel time and passenger convenience, security, safety and comfort during a measurement period prior to the Closure Period (Baseline Measurement Period.)"
>
> "During the Closure Period and for one year after the Tunnel is reopened, the M&M Committee shall continue to monitor downtown Seattle transportation system performance and make recommendations to the Parties to take actions to maintain said system performance. In performing its functions, the Committee shall be directed to (a) consult with and seek input from suburban stakeholders and (b) report quarterly to the City Council's Transportation Committee regarding the performance of the downtown transportation system and regarding the Committee's consultation with various stakeholders."

The M&M Committee will issue regular performance reports on traffic/transit operations in the Seattle Central Business District (CBD) during tunnel closure and for one year after the Tunnel is reopened. This report is the initial installment of these performance reports and will document baseline pre-tunnel closure conditions for six specific performance measures. The six performance measures are as follows:

- Transit travel time
- General purpose traffic operations
- Transit passenger and bus volumes
- Pedestrian activity at bus zones
- Seattle Central Business District (CBD) Customer Surveys
- Transportation demand management (TDM) mitigation programs

Each of the areas was funded as a project within the overall Tunnel Agreement. Within these budget constraints, staff has developed the evaluation methodology and collected data for the baseline period of Spring and Summer of 2005.

Subsequent report updates will compare the baseline data with future data collection efforts for each of the six performance measures. The projected schedule for the release of the report updates is identified in Figure 1, as is the updated data sets that will be available with each report. Eight reports will be issued over the next three and one half years.

Figure 1. Performance Report Release Dates

	Performance Report Release Dates							
Performance Measure Updates	**Sept 05**	**Jan 06**	**March 06**	**July 06**	**Dec 06**	**June 07**	**Dec 07**	**Mar 08**
Transit Travel Time	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
General Purpose Traffic Operations	⊙	⊙		⊙		⊙		⊙
Transit Passenger and Bus Volumes	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
Pedestrian Activity at Bus Zones	⊙	⊙	⊙				⊙	
Surveys of CBD customers	⊙			⊙				⊙
TDM mitigation programs	⊙	⊙		⊙	⊙	⊙	⊙	⊙

It is the intent of the M&M Committee to use these reports as a means of communicating on a regular basis the actions taken by the M&M Committee to address any deficiencies in the performance of the CBD transportation system during tunnel closure. In January 2006 the M&M Committee will issue the second installment of this report which will provide a summary of the initial experiences with tunnel closure operations and any measures taken in response to specific operational problems and "hot spots" that developed.

Executive Summary of Baseline Report

This is the first of eight reports that will be issued to report on a set of six performance measures for the Seattle Central Business District before, during and after tunnel closure.

1. Transit travel time is the first measure. It is being computed using data collected from a new Metro King County Central Business District (CBD) bus monitoring system. These are two basic measurements:
   - The first measurement is a travel time index that will reflect the change in the average amount of time each bus trip spends within the study area, including layover. For pre-tunnel conditions, this number was equal to 21:59 minutes during the 4-6pm peak. The index will be set at 100 for baseline conditions. For subsequent reports, the average travel time figure will be recalculated using updated transit travel information. The index will be adjusted based on the percent change from baseline. The index then becomes a good indicator of the overall changes in bus travel time in the central business district.
   - The second measurement is bus travel time along four distinct transit corridors. These corridors are as follows: First Avenue; Second Avenue; Third Avenue; and Fourth Avenue. Transit travel time in the 4pm -6pm peak for pre-tunnel closure conditions ranges from 6:51 minutes to 11:24 minutes among these four corridors. Changes in transit travel time along these four corridors will be reported.
2. The status of general-purpose traffic is the second measure, and it is being monitored over time by the Seattle Department of Transportation two ways.
   - First, tube counts are being used to collect daily and hourly travel volumes by lane at over 30 locations, to be summarized as peak hour and daily volumes by direction of travel.
   - Secondly, floating car travel time studies are being conducted to determine how long it takes to travel along a set of seven distinct auto paths through the Seattle CBD. For the baseline data, peak hour travel volumes range from a high of 1,800 vehicles at Fourth Avenue and Union Street to a low of 280 vehicles at Second Avenue and James Street. PM peak hour auto travel times vary among the seven paths, but for illustrative purposes, travel times along northbound First Avenue, northbound Fourth Avenue and eastbound Spring Street are 4:07min, 4:52min and 3:43min, respectively. SDOT collected the baseline data and will be repeating this data collection effort for three more times during tunnel closure and one time after the tunnel reopens.
3. Transit passenger and bus volumes are the third measure. These will be reported using data from Metro King County's automatic passenger counting system and scheduling system. Transit passenger reports will include average daily riders, average 1 hour PM peak period riders, and data on overloads. Currently, there are about 95,000 daily riders that cross the downtown screenline at University Street, with about 10,000 of these riding during the 1-hour peak hour from 4:30pm to 5:30pm. Bus volumes before and after tunnel closure will also be reported and when compared with before tunnel closure conditions, should show that bus volumes will have increased on the surface streets by approximately 30% overall.
4. Pedestrian activity at bus zones is the fourth measure. Pedestrian activity will be surveyed in and around bus stops to establish a level of service for pedestrians waiting to catch the bus and for pedestrians walking through the bus stop zone. The baseline survey was conducted by King County Metro in March and April 2005 at 19 of the most active bus stops in the Seattle Central Business District. These stops experience higher levels of pedestrian activity.

   During the PM peak, it was determined that almost all of the bus stops operate at a desirable level of service for passengers waiting to catch their bus, as defined by a King County level of service methodology, with the exception of the bus stops at Second Avenue and Pike Street, Second Avenue

and University Street, and Fifth Avenue and James Street. These three locations will be closely monitored during tunnel closure.

All of the sidewalk segments within the bus stop zones that were surveyed operate at high level of service (LOS A), during the evening peak 15 minute period, as measured by the Highway Capacity Manual.

The pedestrian survey will be repeated in October 2005 after tunnel closure and then again in October 2007, after the tunnel reopens.

5. Customer surveys of bus riders and auto drivers to the Seattle CBD is the fifth measure. A market research firm has been retained by King County Metro to survey transit riders and drivers who park in downtown garages. The before tunnel closure survey was conducted in the spring 2005. There will be a post tunnel closure survey in spring 2006 and one after the tunnel reopens in spring 2008. These three surveys will track the demographics and attitudes of these two downtown user groups.

   Pre-tunnel closure survey results show that, for the most part, how one travels to downtown Seattle has little influence over perceptions of the downtown experience. Respondents who ride the bus and those who drive or carpool to downtown, have a generally positive impression of downtown Seattle. They do not feel crowded when they walk around downtown Seattle and are generally satisfied with their personal security and safety.

6. Transportation Demand Management Program (TDM) is the sixth and final area that will be tracked and reported in these evaluation reports. The TDM program funded by the M&M program is comprised of nine distinct TDM programs. Four are existing programs, to which new incentives/enhancements have been added for the period of tunnel closure. Three are new programs that have been created to attract new users or retain users of alternative travel modes. Two are new programs designed to support an operating environment that will increase the attractiveness of alternative modes. The relevant use statistics associated with each TDM program will be collected and reported. Baseline data was compiled in May 2005, prior to the Bus Tunnel Closure. After the launch of the new or expanded TDM programs, data will be collected quarterly and reported on a semi-annual basis, through September 2007.

Measure 1: Transit Travel Time

Monitoring Objectives

The purpose of monitoring transit travel times is to answer the following questions regarding transit travel times in the Seattle Central Business District(CBD) before and after tunnel closure:

- How long are the transit travel times in the Seattle CBD?
- How consistent are the transit travel times in the Seattle CBD?
- Where are slowdowns occurring and are there mitigation measures that might address these slowdowns?

Methodology

The transit travel time monitoring system consists of a network of sixteen detection points in the Seattle CBD. The locations of these detection points are identified in Figure 2. The detection equipment at each location is a radio frequency (RF) tag reader identical to those used in the Transit Signal Priority (TSP) system. The TSP support systems are used to manage the equipment, and retrieve and store data. However, the monitoring system is not designed to support or operate TSP in the Seattle CBD signal system.

The vehicle equipment is a RF tag encoded with data including transit agency and vehicle identification. Coaches providing Metro service, Metro-operated Sound Transit service, Community Transit service, and Pierce Transit service operating in the Seattle CBD are equipped with tags. In addition, Metro service coaches include assigned Route/Run.

Communication to the field equipment is done primarily through wireless spread-spectrum radios. Data transmission to the central system is handled through a phone drop installed in the signal controller cabinet at Fifth Avenue S and Dearborn Street.

The raw data from the monitoring system consists of time-stamped tag reads from buses as they pass detection points. These tag reads are stored and post-processed to match a series of reads at various locations to form trips. The system is designed to give two detection points for at least 90% of the scheduled transit trips in the Seattle CBD.

The collection of transit travel times began in summer 2005 and will be continuously collected throughout the tunnel closure period. The basic measurement for the summary statistics is the single transit trip travel time. Analysis of the resulting travel time data from the monitoring system will be available at different levels of detail. These four levels of analysis are described below.

Level 1 and Level 2 data will be included in the regular performance reports issued by the Monitor and Maintain Committee:

Level 1: Seattle CDB summary statistics will be the highest level summary consisting of aggregated travel times through the study area to define an average transit operating time in the Seattle CBD for the AM peak and the PM peak. This measure will show the amount of time a bus takes on average to traverse the downtown area. Considered over time, this measure will give an overall trend of the increase or decrease in delay caused by tunnel closure.

Level 2: Transit Corridor Travel Time summary will track travel time along a discrete set of transit corridors in the central business district. The transit corridors included in the monitoring are identified in Figure 2. The data will be categorized by corridor and by time of day (AM peak and PM peak). Variability of the data will also be reported to show the consistency of transit travel times.

Figure 2. Transit Travel Time Summary Analysis Corridors and Detection Point Locations

Level 3 and Level 4 data will assist planning and scheduling staff in responding to future mitigation efforts:

Level 3: Street level summary will support the planning and design of additional mitigation measures for specific street segments. This analysis will use the variations in route paths both to identify trouble spots and to evaluate traffic operations treatments designed to mitigate them. The principle product of this type of analysis will be average transit speed by street segment for the PM peak period.

Level 4: The route level summary is intended for use by transit operations. This data will be available through a self-service software application to transit planners and operations personnel. This level of analysis will facilitate investigations into individual route and path performance, and serve as a tool for adjusting transit schedules and transit routing.

Baseline Data

Seattle CBD Travel Time Summary (Level 1):

The first level of analysis for downtown transit travel time is a composite measurement of average time spent in the study area. This value is obtained by identifying the first and last observation of a bus trip in the CBD, regardless of the corridor. Averaging this figure for all trips results in a single value of time spent in the CBD for all observed trips.

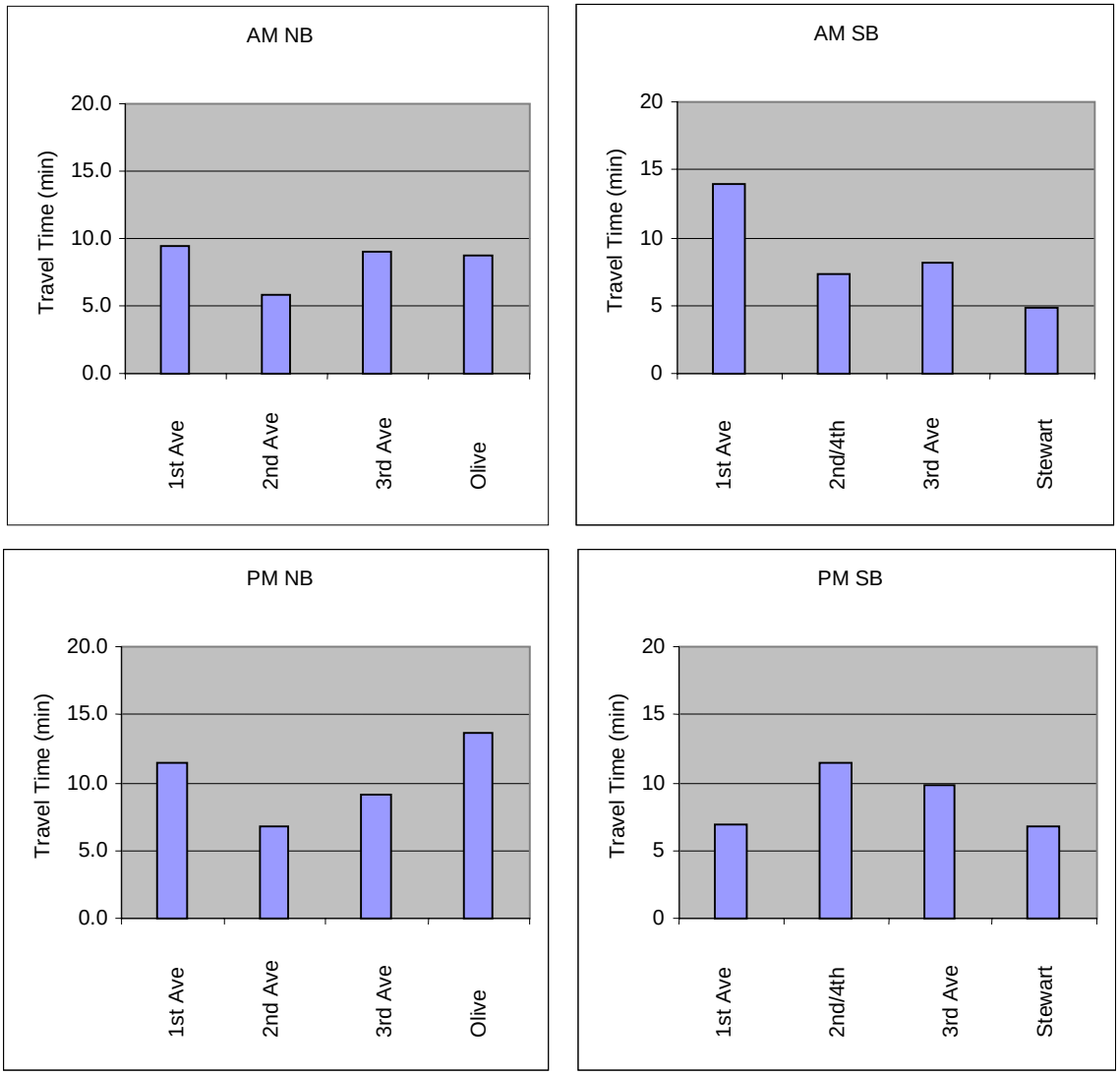
This value will be used as an index, not a measure. This figure includes layover time as well as through-routed trips under one measurement. It will also include many different paths through the CBD with different lengths and travel conditions. The measure becomes meaningful when compared to the same measurement in the future to compare the ease of travel for transit through the CBD.

The baseline Travel Time Index is **100**, representing the value before tunnel closure. The average travel time value was determined to be 21:59, based on bus trips between 4pm and 6pm on weekdays during the month of July. Future reports will present an index calculated by dividing the observed average travel time for the report period by 21:59, multiplied by 100. This will return an index that is the ratio of the current measurement to the baseline figure, so an index of 110, for instance, would mean bus trips in the CBD are 10% longer than before tunnel closure.

Transit Corridor Travel Time Summaries (Level 2)

The four charts below show the average travel times for transit before tunnel closure. The data was collected in July and August of 2005 using the monitoring system. Each chart shows the average travel time for the direction of travel and time of day indicated. The AM charts include buses observed between 7am and 9am at the first reader on the corridor being measured. The PM charts cover the time period from 4pm to 6pm.

Figure 3. Transit Corridor Travel Time Before Tunnel Closure



These corridor average travel times will be compared to future measurements of travel time after the closure of the bus tunnel. Corridor travel times should not be compared to each other. Readers were placed to ensure route coverage. Readers were also sited to facilitate communications and insure access to power. As a result, the measured corridors differ in length, number of stops and number of signals, all of which affect travel time but are not related to congestion. The corridor boundaries and baseline measurements are described below. Future reports will present the historical data along side current measurements.

The reader locations that define the boundaries of each of the transit corridors are described below along with a table for each corridor that summarizes the Average Travel Time by time period along with the standard deviation (SD) of the observations in minutes. As a statistical measure, approximately 69% of all observations are within one standard deviation of the average. The SD can be interpreted as approximating the range (+/- SD) of the typical travel time that a majority of bus riders will experience on the corridor.

First Avenue (Northbound and Southbound) reader locations are Royal Brougham to the south, and Stewart Street to the north, with a midpoint at Seneca Street. The initial travel time measurements are for the segment between Seneca Street and Royal Brougham only because of delays in powering the Stewart Street reader.

Figure 4A. First Avenue Transit Travel Time and Variation

First Avenue	**AM Peak (7am – 9am)**	**PM Peak (4pm – 6pm)**
Northbound, Royal Brougham to Seneca Street	Travel time: 9 min 22 sec *(SD: 4.8 min)*	Travel Time: 11 min 24 sec *(SD: 5.3 min)*
Southbound, Seneca Street to Royal Brougham*	Travel time: 14 min *(SD: 8.8 min)*	Travel time: 6 min 51 sec *(SD: 3.9 min)*

Second Avenue (Southbound only) reader locations are Pike Street and S Jackson Street with a midpoint at Seneca Street.

Figure 4B. Second Avenue Transit Travel Time and Variation

Second Avenue	**AM Peak (7am – 9am)**	**PM Peak (4pm – 6pm)**
Southbound, Pike Street to S Jackson Street	Travel time: 7 min 20 sec *(SD: 1.9 min)*	Travel time: 11 min 26 sec *(SD: 4.3 min)*

Third Avenue (Northbound and Southbound) reader locations are Stewart Street to the north, and Yesler Way to the south, with a midpoint at Seneca Street.

Figure 4C. Third Avenue Transit Travel Time and Variation

Third Avenue	**AM Peak (7am – 9am)**	**PM Peak (4pm – 6pm)**
Northbound, Yesler Way to Stewart Street*	Travel time: 9 min *(SD: 4.6 min)*	Travel Time: 9 min 6 sec *(SD: not available)*
Southbound, Stewart Street to Yesler Way	Travel time: 8 min 5 sec *(SD: 1.3 min)*	Travel time: 9 min 45 sec *(SD: 2.5 min)*

Fourth Avenue (Northbound only) reader locations are Seneca Street to the north and S Jackson Street to the south.

Table 4D. Fourth Avenue Transit Travel Time and Variation

Fourth Avenue	**AM Peak (7am – 9am)**	**PM Peak (4pm – 6pm)**
Northbound, S Jackson Street to Seneca Street	Travel time: 5 min 48 sec *(SD: 1.2 min)*	Travel Time: 6 min 46 sec *(SD: 1.1 min)*

Olive Way (Eastbound only) reader locations are Third Avenue to the West and Eighth Avenue to the East.

Table 4E. Olive Way Transit Travel Time and Variation

	AM Peak (7am – 9am)	**PM Peak (4pm – 6pm)**
Eastbound, Third Avenue to Eighth Avenue	Travel time: 8 min 42 sec *(SD: 9.1 min)*	Travel Time: 13 min 43 sec *(SD: 9.7 min)*
Eastbound Holgate, Eighth Ave to Yale Street	Travel time: 2 min 6 sec *(SD: 1.4 min)*	Travel Time: 5 min 25 sec *(SD: 3.1 min)*

Stewart Street (Westbound only) reader locations are Third Avenue to the West and Ninth Avenue to the East.

Table 4F. Stewart Street Transit Travel Time and Variation

	AM Peak (7am – 9am)	**PM Peak (4pm – 6pm)**
Westbound, Ninth Avenue to Third Avenue	Travel time: 4 min 50 sec *(SD: 1.9 min)*	Travel Time: 6 min 42 sec *(SD: 1.5 min)*

Note: Due to the difficulties encountered in activating the reader at Ninth and Stewart, travel time data for Stewart corridor could not be extracted from the new reader-based Seattle CBD monitoring system. For future updates of this report, the reader at Ninth and Stewart will be operational. For the baseline report, an estimate of Stewart travel times was prepared using Metro's system wide sign post-based automatic vehicle location system

Measure 2: General Purpose Traffic Operations

Monitoring Objectives

The purpose of monitoring general purpose traffic operations is to measure the impacts of tunnel closure on general purpose traffic in the following areas:

- Measure the change in general purpose traffic volumes
- Measure the change in general purpose travel times
- Review traffic operations in the Seattle CBD and make revisions as needed

Methodology

Tube counts will be used to collect traffic volumes at selected locations throughout the Seattle CBD. These automated counting machines yield hourly and daily lane volumes.

Travel time studies will be conducted to quantitatively assess changes in travel time for general traffic on First Avenue, Second Avenue, Fourth Avenue, Stewart Street, Pike Street and Spring Street, before and after the tunnel closure. Floating car travel time runs will be used to collect this data. This consists of probe cars driven along the routes, where the driver records the time it takes to traverse the route moving within the flow of general traffic. See Figure 5 for the seven distinct paths that will be used for the floating car travel time studies.

The proposed roadway revisions, traffic delineation and control measures, instituted as part of the pre-tunnel closure mitigation effort, are expected to partially mitigate the anticipated traffic circulation and access issues in the Seattle CBD transportation network. However, an increase in congestion and some reduction in accessibility are anticipated. The future data collection compared to the pre-tunnel closure baseline data will be useful for identifying problem areas and taking appropriate actions, where feasible.

The principle measures of effectiveness that will be included in the performance reports under this measure are as follows:

- Change in peak hour traffic volume: %
- Change in daily traffic volume: %
- Change in travel time: Minutes

In addition, manual turning movement counts will be conducted at selected intersections within the Seattle CBD as needed to assess levels of congestion during the PM peak hour, before and after tunnel closure. For these counts, staff will record all of the movements at the intersection as through, right or left. These types of counts will be available to help identify shifts in traffic patterns.

In reviewing this data, the ongoing traffic operations evaluation of the Seattle CBD will include the following types of considerations:

- How has travel time changed for the parallel routes along the corridor and why has it changed?
- What operational concerns have been identified by road users and adjacent businesses?
- What are the impacts of the turning movements on transit operations?
- Has tunnel closure increased congestion and delays for general traffic, and if so, by how much?
- Are there additional mitigation measures for reducing delays that are feasible?
- What traffic revisions are anticipated after the tunnel reopens?

Figure 5. Floating Car Travel Time Paths

Baseline Data

Figures 6A and 6B summarize the baseline results for the general-purpose traffic counts for the PM peak hour and for daily traffic volumes.

Figure 6A. PM Peak Hour Traffic Counts

Figure 6B. Average Daily Traffic Counts

Figures 7A and 7B summarize the results of the floating car travel time studies for general purpose traffic in downtown Seattle along the travel paths outlined in Figure 5.

Figure 7A. Average Travel Time - General Purpose Traffic Baseline Conditions - February 2005 Northbound-Southbound Paths

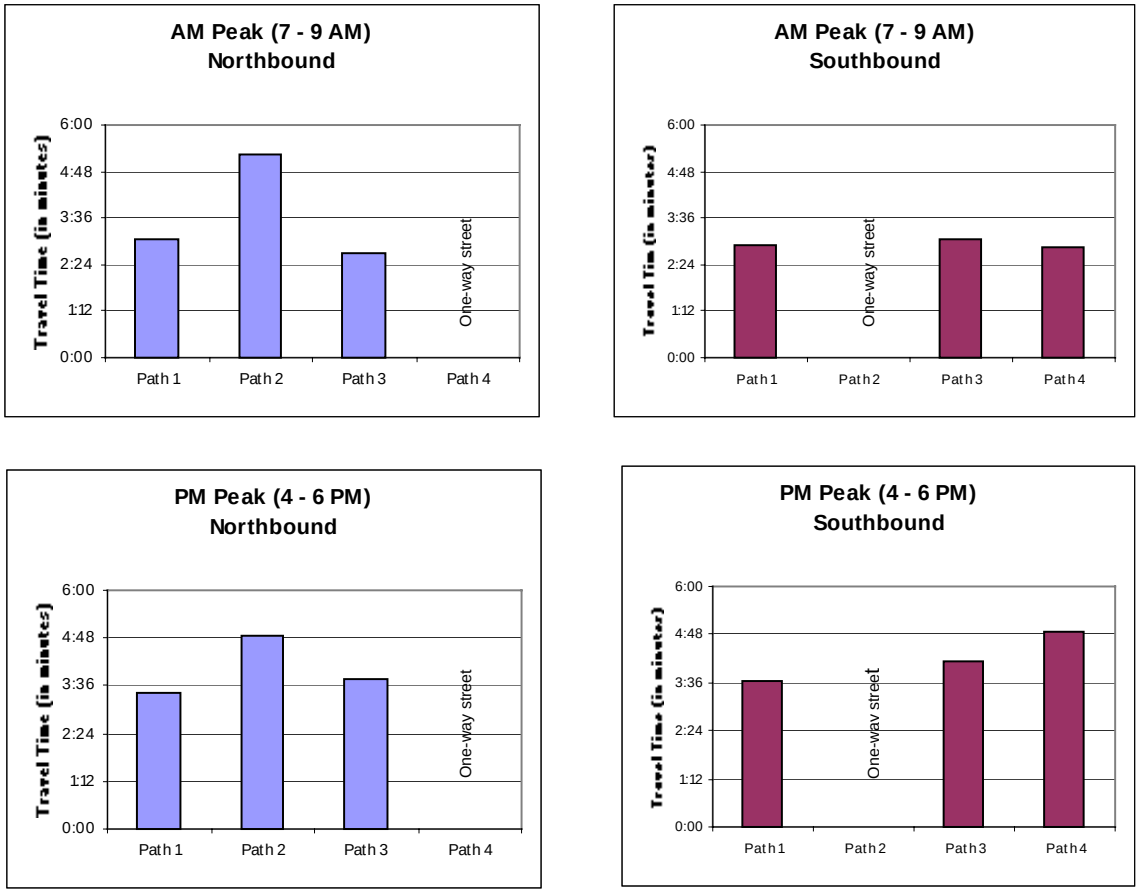
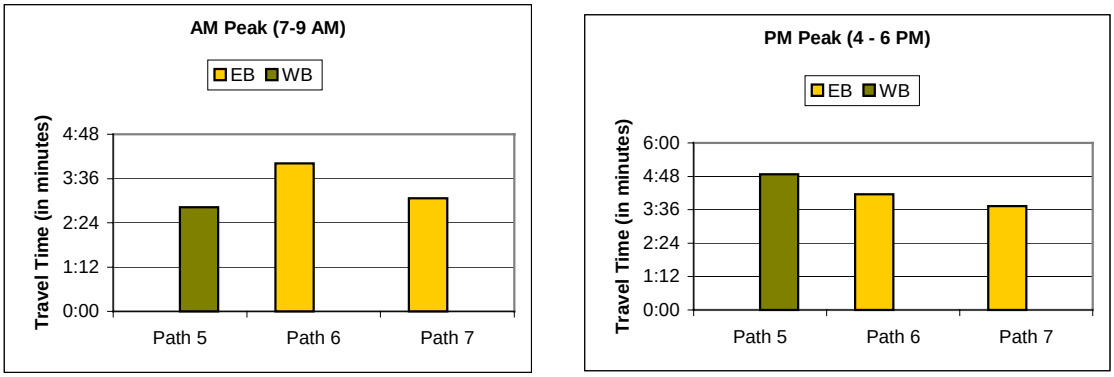


Figure 7B. Average Travel Time - General Purpose Traffic Baseline Conditions - February 2005 Eastbound - Westbound



Measure 3: Transit Passenger and Bus Volumes

Monitoring Objectives

The purpose of monitoring transit passenger and bus volumes is as follows:

- Provide data on bus volumes by street segment in downtown Seattle
- Measure the average weekday PM peak hour and weekday passenger loads crossing the Seattle CBD north-south screenline
- Provide data as available from Community Transit and Pierce Transit on average ridership crossing the north-south screenline during average PM peak hours and weekdays
- Identify and analyze any substantive changes in ridership or bus volumes for before and after tunnel closure conditions

Methodology

Bus volumes will be extracted from HASTUS, the King County Metro scheduling system for the before tunnel closure condition using the February 2005 service changes. These counts will include in service as well as out of service coaches. Additionally, the projected bus volumes on downtown streets after tunnel closure have also been computed. These can then be compared with actual bus volumes from the September 2006 service change that will be implemented in conjunction with tunnel closure. In subsequent monitoring report, from the M&M Committee the most useful comparison will be between projected bus volumes and actual post tunnel closure bus volumes.

For passenger loads, the Automated Passenger Count (APC) system is the primary source for passenger data for Metro coaches. APC data is collected in a random sample during each signup, downloaded and processed monthly. This data is summarized in a final form at the end of each signup. Preliminary data, based on smaller samples, is available monthly. Metro driver count data is collected on an ad hoc basis when preliminary APC results indicate that observations of trips on a particular route will fall below an adequate sample. Ridership data on Community Transit and Pierce Transit service is generated by the monitor reports supplied by each of these agencies. The ridership data from Community Transit and Pierce Transit is available by signup at the aggregate level.

APC data, supplemented by driver counts and estimates for any non-APC-observed trips, has been used to estimate Metro ridership volumes crossing the screenline just south of University Street, by trip, for the Fall 2004 and Spring 2004 signups during the PM peak hour and the average weekday. The results have been summarized by street and by direction to provide a baseline for future comparison of ridership volumes and loads. After tunnel closure, any significant changes in either ridership volumes or overloads, by route or by avenue from the baseline, will be identified and analyzed in future performance reports.

Baseline Data

Existing bus volumes before tunnel closure and projected bus volumes after tunnel closure by street segment are summarized in Figures 8A and 8B.

Figure 8A. PM Peak Hour Transit Volumes- February 2004 Service Change

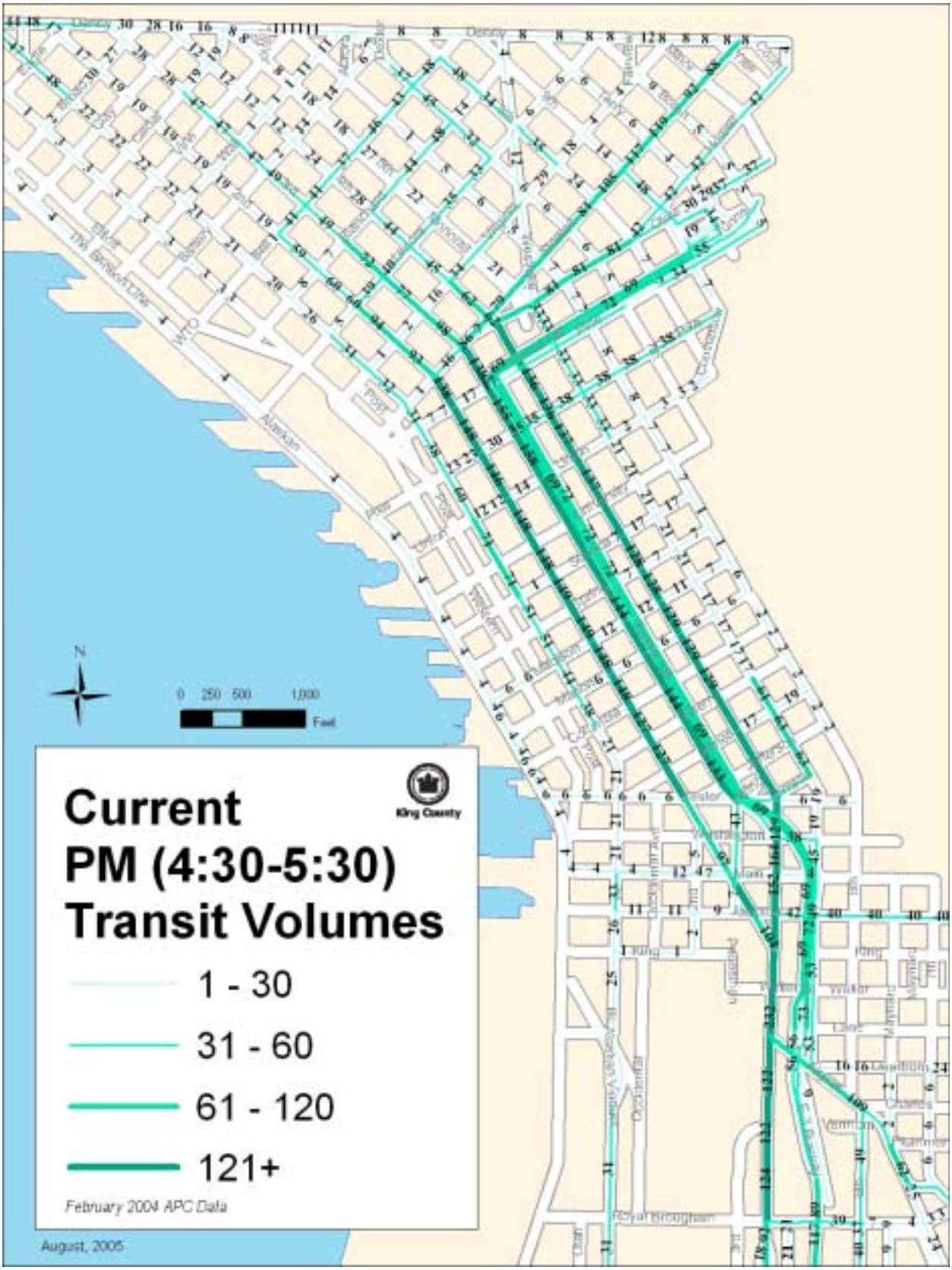


Figure 8B. Projected PM Peak Hour Transit Volumes - September 2005 Service Change

Figure 9 summarizes by street the approximately 95,000 riders that cross the downtown screenline at University Street, traveling north and south. There are about 12,000 of them riding during the PM peak hour from 4:30pm to 5:30pm. Overloads are relatively uncommon, with the highest number of trips with standing loads occurring on southbound Third Avenue. Tunnel buses carry about 20 to 30 percent of riders at the screenline; these riders presumably represent the increased ridership that will be seen on the surface during the study period.

Figure 9. Passenger Loads at University Street, Fall 2004

		Average Daily			Average PM 1-Hour Peak		
Avenue	Dir	Riders	Standing Loads	Over 20% Load	Riders	Standing Loads	Over 20% Load
First	N	8,970	1.65%	0.00%	838	6.17%	0.00%
	S	3,998	0.00%	0.00%	477	0.00%	0.00%
Second	S	14,273	0.61%	0.12%	2,525	0.00%	0.00%
Third	N	15,883	0.71%	0.11%	1,469	1.49%	0.00%
	S	15,784	3.89%	0.85%	1,839	4.65%	1.55%
Fourth	N	8,898	0.61%	0.43%	949	.73%	0.00%
Fifth	S	2,453	0.40%	0.40%	148	0.00%	0.00%
Tunnel	N	12,037	0.27%	0.00%	1,153	0.00%	0.00%
	S	12,294	0.55%	0.09%	2,174	1.45%	0.72%
Total		94,590	1.10%	0.24%	11,572	1.67%	0.39%

As shown in Figure 10, standing loads occur on approximately 3 percent of trips leaving downtown from the morning through the evening peak, with lower percentages in the evenings. Loads over 20 percent of seat capacity occur on less than 1 percent of trips throughout the day.

Figure 10. Percent of Trips Leaving CBD Averaging Standing Loads, Fall 2004

	AM Peak 6-9Am	Midday 9AM – 3PM	PM Peak 3 –7PM	Evening 7 – 11PM	Total
Standing Loads	2.84%	3.03%	3.38%	1.20%	2.78%
Over 20% Load	0.32%	0.67%	0.70%	0.17%	0.54%

In Fall 2005, similar data will be collected and compared to the baseline data, and the report will indicate changes in the screenline and load measures. If significant differences in standing loads are found in the comparison, a more detailed report will also be prepared, analyzing the sources of the differences at route and trip levels.

Measure 4: Pedestrian Activity at Bus Zones

Monitoring Objectives

The purpose of monitoring pedestrian activity as bus zones is to quantitatively assess pedestrian congestion at critical bus stops within the Seattle CBD. In particular, the study will focus on the impacts that transit tunnel closure will have on pedestrian congestion at or near bus stops on surface streets. The study aims to answer the following key questions over the course of the evaluation:

- How crowded are bus stops before tunnel closure?
- How easily can pedestrians flow through the bus stop area before tunnel closure?
- Does the tunnel closure have significant impacts on the pedestrian environment at or near bus stops?

Methodology

This study will focus on two elements of pedestrian congestion: pedestrian crowding and pedestrian flow.

Pedestrian crowding is applicable to waiting and queuing areas, and is based on the average space available per person. The *Transit Cooperative Research Program (TCRP) Transit Capacity and Quality of Service Manual* specifies criteria for Level of Service (LOS) designations ranging from A to F for queuing and waiting areas (Part 7, Chapter 3). In addition to these national guidelines, Metro will apply its own criteria to the amount of space available per person in bus stop waiting areas. Metro established these criteria because of the unique operating requirements and observed pedestrian behavior at bus stops within the Seattle CBD.

The criteria for pedestrian crowding are shown in Figure 11. For each bus stop, the LOS for standing pedestrians will be reported separately for both the full bus zone waiting area, and for the critical loading area defined as the space within 100 feet behind the head of the bus stop.

Figure 11. National and King County Metro criteria for Standing Pedestrian Level of Service (LOS)

HCM Criteria	ft^2/ped
LOS A	> 13
LOS B	10 -13
LOS C	6 - 10
LOS D	3 - 6
LOS E	2 - 3
LOS F	< 2

KCM Criteria	ft^2/ped
Desirable	>17
Constrained	17 - 8
Uncomfortable	< 8

Pedestrian flow is applicable to the movement through the bus zone and is based on the number of pedestrians passing through the area over time. Pedestrian flow is applicable to people walking through an area of limited width, and is based on the number of people per minute passing through a walkway of given width. The *2000 Highway Capacity Manual* specifies criteria for LOS designations of A through F for walkways. In addition to these criteria, pedestrian level of service will be further evaluated using procedures outlined in *Urban Spaces for Pedestrians* by Pushkarev and Zupan (1975), Figure 12 shows how these criteria relate to the number of pedestrians passing per minute through and area of unit width.

Figure 12. Criteria used for Walking Pedestrian Level of Service (LOS)

HCM Criteria	pedestrians/feet/minute
LOS A	< 5
LOS B	5 - 7
LOS C	7 - 10
LOS D	10 - 15
LOS E	15 - 23
LOS F	>23

Pushkarev & Zupan Criteria	pedestrians/feet/minute
Open	< 0.5
Unimpeded	0.5 - 2
Impeded	2 - 6
Constrained	6 - 10
Crowded	10 - 14
Congested	14 - 18

Prior to actual data collection in the field, staff visited each bus stop, took photographs, and determined the number of data collectors needed for accurate sampling. An inventory of items that would reduce the effective waiting area (trashcans, shelter walls, newspaper boxes, etc.) was also collected at this time to establish the total area available for waiting passengers. The end product was a set of drawings of the sidewalk area around each bus stop, including the boundaries that define the waiting area for each bus stop, the areas used for standing pedestrians versus walking pedestrians, and the critical loading zone area.

A team of data collectors was assigned to the targeted bus stops to collect pedestrian count data for baseline conditions. Typically, three-person survey teams were assigned to each bus stop for each observation period. Some data collectors count the number of people waiting within the pre-defined waiting areas, and are responsible for taking a count every 2-5 minutes at the bus stop. Other data collectors continuously observe each bus stop, counting the number of people walking through the bus stop area in 2-5 minute intervals.

For the baseline data, each bus stop was observed for three days, during a two-hour period within the PM peak (3pm-7pm) only. One data collection was done on a Friday; the remaining two were done on a Tuesday, Wednesday, or Thursday. In addition, the following information was collected:

- A measurement or estimates of the width available for pedestrian flow on sidewalk and in building access ways, if the width was constrained by waiting passengers.
- Pedestrian flows through nearby building entrances. (Baseline report only)
- Any other factors that impacted pedestrian access to adjacent businesses

Pedestrian count data will be collected at four discrete intervals. The baseline counts were taken during late March through April 2005. The proposed schedule for the balance of these surveys is shown below:

Figure 13. Schedule for Pedestrian Data Collection

Scenario	Data Collection Timeframe	Results Available	Number of Surveyed Stops
Before tunnel closure	March/April 2005	September 2005	19
During tunnel closure	October 2005	December 2005	20
Follow-up study	March/April 2006	May 2006	5 *
After closure	October 2007	December 2007	20

* Note that the follow-up study in 2006 will only be undertaken if it becomes necessary to evaluate additional mitigation measures that are identified and implemented after tunnel closure specifically to address bus stop congestion issues.

Figure 14 shows the 19 bus stops that were surveyed. An additional stop will be added to the survey to include a new stop that will be installed for tunnel closure.

Figure 14. Bus Stops Surveyed for Pedestrian Congestion Counts

Baseline Data

Figure 15 summarizes the results of the baseline study as it relates to pedestrians walking through the bus zones. Figure 16 summarizes the results of the baseline study as it relates to pedestrians waiting at the bus stops.

Figure 15. Walking Pedestrian Rank and Level of Service by Bus Stop(*Map ID# can be found on Figure 14)*

Current Pedestrian Use				Through Bus zone				Through Adjacent Building Doorway			
Map ID #	Bus Stop #	On-street/Location	W_E*	Peds/ Peak 15 min	Ped/ Ft/ min	Pushkarev & Zupan Rank	HCM LOS	Total Demand (peds/ Min)	Peds/Door/ Min (ped/ft/ min)	Pushkarev & Zupan Rank	HCM LOS
1	450	3rd Ave./Union St.	8.75	195	1.5	Unimpeded	A	3	.05	Unimpeded	A
2	590	3rd Ave./Pine St.	8.25	236	1.9	Unimpeded	A	5	0.5	Unimpeded	A
3	538	3rd Ave./Columbia St.	5.5	132	1.6	Unimpeded	A	3	0.8	Unimpeded	A
4	315	2nd Ave./University St.	4.5	194	2.9	Impeded	A	2	1	Unimpeded	A
5	548	3rd Ave./Madison St.	8	126	1.1	Unimpeded	A	6	1	Unimpeded	A
6	690	4th Ave./Union St.	3.5	179	3.4	Impeded	A	4	1	Unimpeded	A
7	860	5th Ave./James St.	3.25	139	2.9	Impeded	A	4	1	Unimpeded	A
8	430	3rd Ave./Pine St.	7.5	258	2.3	Impeded	A	6	1.5	Unimpeded	A
9	682	4th Ave./University St.	10	218	1.5	Unimpeded	A	7	1.8	Unimpeded	A
10	490	3rd Ave./Columbia St.	5	143	1.9	Unimpeded	A	4	2	Impeded	A
11	531	3rd Ave./James St.	6.75	84	0.8	Unimpeded	A	12	2	Impeded	A
12	570	3rd Ave./Union St.	5.25	236	3	Impeded	A	4	2	Impeded	A
13	1040	Olive Way/6th Ave.	3.5	166	3.2	Impeded	A	8	2	Impeded	A
14	480	3rd Ave./Marion St.	5.5	132	1.6	Unimpeded	A	9	2.3	Impeded	A
15	468	3rd Ave./Seneca St.	7.5	316	2.8	Impeded	A	15	2.5	Impeded	A
16	578	3rd Ave./Pike St.	8.25	323	2.6	Impeded	A	10	2.5	Impeded	A
17	500	3rd Ave./James St.	3.5	79	1.5	Unimpeded	A	3	3	Impeded	A
18	300	2nd Ave./Pike St.	3.75	127	2.3	Impeded	A	[not counted]			
19	700	4th Ave./Pike St.	8.5	171	1.3	Unimpeded	A	[not counted]			

* W_E = *Effective Sidewalk Width*

All of the sidewalk segments within the bus stop zones currently operate at a high level of service, LOS A, as measured by the HCM method, during the evening peak 15-minutes. However, several of the sidewalk segments operate with 'impeded' conditions according to the Pushkarev and Zupan ranking, which is a more stringent standard. The higher pedestrian flows at these locations are caused by a combination of high pedestrian volumes, narrow sidewalk widths, and more standing pedestrians and street furniture occupying sidewalk space.

Figure 16. Standing Pedestrian Level of Service for Full Bus Stop Area and Critical Loading Zone
(*Map ID# can be found on Figure 14)*

Current Pedestrian Use					Full Zone		Critical Zone	
Map ID #	Bus Stop #	On-street/Location	Max Number Peds	SF/Ped	HCM LOS	King County Rank	HCM LOS	King County Rank
2	590	3rd Ave./Pine St.	46	20	A	Desirable	A	Desirable
7	860	5th Ave./James St.	66	21	A	Desirable	B	Constrained
4	315	2nd Ave./University St.	95	22	A	Desirable	A	Constrained
13	1040	Olive Way/6th Ave.	46	23	A	Desirable	A	Desirable
18	300	2nd Ave./Pike St.	82	25	A	Desirable	A	Constrained
6	690	4th Ave./Union St.	54	30	A	Desirable	A	Desirable
1	450	3rd Ave./Union St.	57	33	A	Desirable	A	Desirable
16	578	3rd Ave./Pike St.	49	33	A	Desirable	A	Desirable
15	468	3rd Ave./Seneca St.	35	37	A	Desirable	A	Desirable
8	430	3rd Ave./Pine St.	39	46	A	Desirable	A	Desirable
14	480	3rd Ave./Marion St.	35	46	A	Desirable	A	Desirable
12	570	3rd Ave./Union St.	39	47	A	Desirable	A	Desirable
9	682	4th Ave./University St.	68	48	A	Desirable	A	Desirable
5	548	3rd Ave./Madison St.	35	50	A	Desirable	A	Desirable
19	700	4th Ave./Pike St.	51	55	A	Desirable	A	Desirable
17	500	3rd Ave./James St.	22	64	A	Desirable	A	Desirable
3	538	3rd Ave./Columbia St.	21	64	A	Desirable	A	Desirable
10	490	3rd Ave./Columbia St.	23	76	A	Desirable	A	Desirable
11	531	3rd Ave./James St.	17	84	A	Desirable	A	Desirable

During the PM peak period, all of the bus stops included in this study operate at a high level of service, LOS A, as defined by the nationally accepted guidelines in the Highway Capacity Manual.

Using a more stringent methodology developed by King County, the critical loading areas for three of the buses experience some constraints. These three stops are located at Second Avenue and Pike Street, Second Avenue and University Street, and Fifth Avenue and James Street.

Measure 5: Seattle Central Business District (CBD) Customer Surveys

Monitoring Objectives

The purpose of conducting CBD customer surveys is as follows:

- Formally assess downtown user perceptions, behavior and satisfaction levels before and during tunnel closure and after the tunnel reopens to transit use in order to assess the effectiveness of the mitigation measures sponsored by the M&M Committee.
- Collect informal feedback from downtown users after tunnel closure to better understand if the mitigation efforts are working well or poorly and to identify key areas for immediate improvement or fine-tuning.

Methodology

Formal Customer Survey of Downtown Users

A full-service research consultant was selected to randomly survey selected cluster samples for the two specific downtown groups. The two groups targeted for this survey were transit riders and drivers who park in downtown garages.

Potential respondents are solicited in person to participate in the survey while downtown during the PM peak period. They are then telephoned at home to actually take part in the survey.

The "before" survey occurred in spring 2005. This will be followed by a survey during the closure period in spring 2006, and a third survey after the tunnel reopens to transit travel in spring 2008. Approximately 700-1,000 downtown users will be surveyed each time. The survey will require 10 – 15 minutes to complete.

The type of information collected from bus riders is as follows: purpose of downtown travel; frequency of downtown travel and changes in that frequency; changes in using the bus to travel downtown; overall impression of downtown Seattle; and transit rider satisfaction or dissatisfaction with a number of factors such as travel time by bus through downtown, personal space when waiting at stops, time between buses, on-time performance of buses, location of stops, predictability of bus arrivals and departures, and personal security waiting for buses when dark and during the day.

The type of information to be collected from drivers is as follows: purpose of downtown travel; frequency of downtown travel and changes in that frequency; changes in using a car to travel to downtown; overall impression of downtown Seattle; and driver satisfaction or dissatisfaction with a number of factors such as travel time through downtown by car, convenience of routes through downtown by car, clarity of information (signage, rules) for drivers downtown, ability to park downtown, convenience of parking to destination, and cost of parking.

Both drivers and transit users will be asked about their general satisfaction or dissatisfaction with the following: being able to walk around downtown without feeling crowded; personal security when walking around downtown; adequacy/clarity of information given to downtown users about the tunnel project; things that are working well and working poorly; performance of those responsible for helping ease disruptions; and recommendations for needed changes or adjustments.

Informal Feedback from Downtown Users

Informal feedback will be solicited from downtown users in October 2005 after tunnel closure, and twice during 2006. Patrons will be approached at selected bus stops, and along key downtown streets affected by tunnel closure to participate in this survey. The consultant will solicit names and telephone numbers from downtown users and then telephone them for a short survey.

These informal samples of downtown users will be put together during the PM peak period. The survey will take about 10 minutes. Altogether 200 – 300 participants will be interviewed each time this survey is conducted.

The survey will ask participants for their opinions about what is working well or poorly in following areas: getting to and through downtown; assessment of crowding on streets and sidewalks; clarity of signage and information being provided about tunnel closure; changes to bus service and car routing that were done in response to tunnel closure; and other information/opinions they may choose to offer. Respondents will also be asked for their recommendations on how things could be improved. These informal surveys are intended to provide a general sense for how downtown users are being impacted by tunnel closure. While not statistically valid, these surveys are similar to focus groups, and like focus groups, inferences can be drawn about what people are feeling about their downtown experiences during tunnel closure.

Baseline Data

Demographics

Figure 17 summarizes the demographic data from the survey. Respondents from the Garage/Lot Clusters closely resembled those from the Bus Clusters.

Figure 17. Respondent Characteristics by Cluster Type *(All Bus Cluster and Garage/Lot Cluster respondents)*

(Base)	Bus Clusters (367)	Garage/Lot Users (265)
***Commuter Status**		
Commuter	76%	79%
Non-commuter	24	21
Area		
North King County	62%	53%
South King County	16	20
East King County	8	11
Other	14	17
Trips to Downtown Seattle		
Live in downtown Seattle	3%	1%
Less than once a month	1	2
1 to 5 trips/month	7	14
6 to 9 trips/month	3	3
10 to 19 trips/month	11	7
20 or more trips/month	76	72
Don't know	0	1
Average trips per month	*21*	*18*
****Regular Downtown Seattle Users**		
Yes	98%	93%
No	2	6
Age Groups		
16 to 19	5%	1%
20 to 24	11	5
25 to 34	21	21
35 to 44	19	29
45 to 54	26	27
55 to 64	15	15
65 or Older	2	2
Refused	1	0
Average age	*40 years*	*42 years*
Gender		
Male	49%	42%
Female	52	58

***** A **Commuter** is someone who makes 3 or more work/school trips per week.

****** A **Regular User** lives in downtown Seattle or makes 3+ trips downtown per month.

May not sum to 100% due to rounding.

- At least three-quarters of respondents from both the Bus Clusters and the Garage/Lot Clusters are commuters.
- The majority of respondents interviewed in both cluster groups live in North King County (62% Bus Clusters and 53% Garage/Lot Clusters).
- As expected with the high proportion of commuters, about three in four respondents from both cluster groups reported making 20 or more trips to downtown Seattle per month (76% Bus Cluster, 72% Garage/Lot Cluster).
- A greater percentage of respondents in the Bus Cluster sample were male (49% v. 42% Garage/Lot Cluster). This difference is not statistically significant.
- Respondents from the Bus Cluster were significantly more likely to be regular downtown Seattle users than those from the Garage/Lot Clusters (98% and 93% respectively).

Satisfaction with Bus Travel in Downtown Seattle

Respondents from the Bus Cluster group who use the bus to get to downtown Seattle were asked to rate their satisfaction with eight bus service elements. The results are summarized in Figure 18.

More than three out of four bus riders to downtown were satisfied with:

- The location of your bus stop in downtown (92%)
- Personal security and safety while waiting for the bus during the day (90%)
- The ability of the bus to get you to your downtown destination on time (88%)
- The amount of personal space you have when waiting at downtown bus stops (84%)
- The bus coming when it is supposed to when you are leaving downtown (79%)

Bus riders to downtown were the least satisfied with *personal security and safety in downtown Seattle while waiting for the bus at night* (27% dissatisfied). There were no statistically significant differences in satisfaction for the different bus elements by trip purpose.

Respondents who travel downtown during the morning peak were significantly more likely to be satisfied with the amount of time between buses than those who come downtown between 9am and 3pm (70% and 60% respectively).

Figure 18. Satisfaction with Downtown Bus Service Elements by Trip Purpose
(Bus Cluster respondents who ride the bus to downtown Seattle)

	All Bus Riders	Work/ School	Shopping / Medical/ Other Errands	Dining/ Sports/ Entertainment
(Base)	**(338)**	**(273)**	**(212)**	**(232)**
The amount of time it takes your bus to get through downtown				
Very satisfied	34%	34%	34%	34%
Somewhat satisfied	39	38	41	39
Neutral/Depends on time of day	7	8	6	8
Somewhat dissatisfied	15	15	15	15
Very dissatisfied	5	5	4	4
The location of your bus stop in downtown				
Very satisfied	63%	63%	64%	65%
Somewhat satisfied	29	28	29	28
Neutral/Depends on time of day	1	1	1	1
Somewhat dissatisfied	4	4	3	3
Very dissatisfied	3	3	3	2

Questions 20 - 21: Next are a few questions about your satisfaction with downtown Seattle and downtown bus service. Are you satisfied/dissatisfied with…

Trip purpose groups are not discrete. For example, a respondent who works and attends sports events in downtown Seattle is included in both groups.

"Refused" responses not shown. May not sum to 100% due to rounding.

The amount of personal space you have when waiting at downtown bus stops				
Very satisfied	44%	47%	45%	47%
Somewhat satisfied	40	39	38	38
Neutral/Depends on time of day	3	3	3	3
Somewhat dissatisfied	8	7	9	8
Very dissatisfied	5	4	5	4
The amount of time you have to wait in between buses?				
Very satisfied	24%	25%	18%	25%
Somewhat satisfied	41	40	44	40
Neutral/Depends on time of day	3	2	2	3
Somewhat dissatisfied	22	22	26	22
Very dissatisfied	10	10	10	9
The ability of the bus to get you to your downtown destination on time				
Very satisfied	56%	59%	51%	57%
Somewhat satisfied	32	30	37	32
Neutral/Depends on time of day	<1	<1	<1	<1
Somewhat dissatisfied	7	6	8	8
Very dissatisfied	4	4	4	3
The bus coming when it is supposed to when you are leaving downtown?				
Very satisfied	33%	35%	28%	32%
Somewhat satisfied	45	43	48	47
Neutral/Depends on time of day	2	2	1	2
Somewhat dissatisfied	15	15	17	14
Very dissatisfied	5	5	5	5
Personal security and safety in downtown Seattle while waiting for the bus during the day				
Very satisfied	57%	59%	57%	57%
Somewhat satisfied	33	32	32	33
Neutral/Depends on time of day	2	1	1	1
Somewhat dissatisfied	5	5	6	4
Very dissatisfied	3	3	4	4

Figure 18 - Continued

(Base)	All Bus Riders (338)	Work/ School (273)	Shopping / Medical/ Other Errands (212)	Dining/ Sports/ Entertainment (232)
Personal security and safety in downtown Seattle while waiting for the bus at night				
Very satisfied	18%	20%	19%	18%
Somewhat satisfied	37	39	37	41
Neutral/Depends on time of day	17	17	11	11
Somewhat dissatisfied	16	14	18	15
Very dissatisfied	11	10	15	13

Questions 23 - 28: Next are a few questions about your satisfaction with downtown Seattle and downtown bus service. Are you satisfied/dissatisfied with…

Trip purpose groups are not discrete. For example, a respondent who works and attends sports events in downtown Seattle is included in both groups.

May not sum to 100% due to rounding.

Satisfaction With Car Travel in Downtown Seattle

Eighty-eight percent (88%) of the respondents interviewed from the Garage/Lot Cluster sample travel to downtown Seattle by car or carpool. These respondents were asked five questions about the satisfaction with car travel to and through the downtown area. Fewer than 60% of respondents were satisfied with any of the car travel elements included in the survey. See Figure 19.

Figure 19. Satisfaction with Car Travel through Downtown by Trip Purpose
(Garage/Lot Cluster respondents who go to downtown Seattle by car or carpool)

(Base)	All Car/Carpool Riders (232)	Work/ School (191)	Shopping / Medical/ Other Errands (150)	Dining/ Sports/ Entertainment (189)
The amount of time it takes you by car to get through downtown				
Very satisfied	15%	15%	16%	13%
Somewhat satisfied	39	37	43	41
Neutral/Depends on time of day	4	4	4	4
Somewhat dissatisfied	26	28	25	24
Very dissatisfied	16	17	12	18
Being able to find parking downtown				
Very satisfied	19%	19%	17%	17%
Somewhat satisfied	28	29	30	30
Neutral/Depends on time of day	2	2	1	2
Somewhat dissatisfied	17	16	21	19
Very dissatisfied	34	35	32	33
Being able to find parking that is convenient to your destination in downtown Seattle				
Very satisfied	20%	20%	17%	18%
Somewhat satisfied	38	38	40	41
Neutral/Depends on time of day	1	1	0	1
Somewhat dissatisfied	19	20	22	20
Very dissatisfied	22	21	22	21
The cost of parking in downtown Seattle				
Very satisfied	7%	7%	5%	5%
Somewhat satisfied	18	16	22	19
Neutral/Depends on time of day	1	2	1	1
Somewhat dissatisfied	23	22	27	25
Very dissatisfied	51	54	46	50
The clarity of informational signs downtown telling car drivers how to get around downtown				
Very satisfied	19%	18%	21%	18%
Somewhat satisfied	36	36	36	37
Neutral/Depends on time of day	10	9	8	10
Somewhat dissatisfied	21	22	19	22
Very dissatisfied	14	15	15	13

Questions 32 - 36: Next are a few questions about your satisfaction with downtown Seattle. Are you satisfied/dissatisfied with…

Trip purpose groups are not discrete. For example, a respondent who works and attends sports events in downtown Seattle is included in both groups.

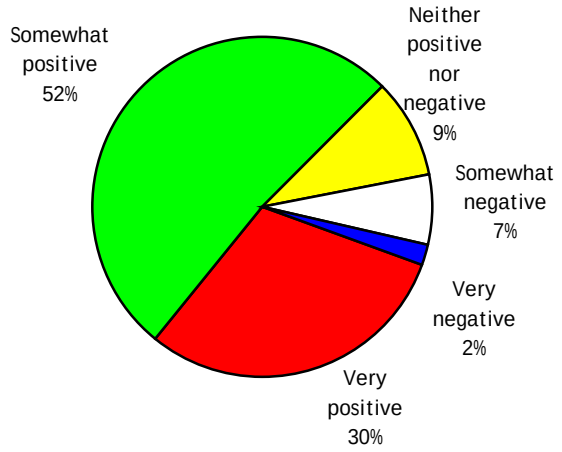
May not sum to 100% due to rounding.

As Figure 19 shows, car travelers to downtown Seattle were most satisfied with "being able to find parking that is convenient to your destination in downtown Seattle" (58% very/somewhat satisfied) and least satisfied with "the cost of parking in downtown Seattle" (74% very/somewhat dissatisfied).

There were no statistically significant differences in satisfaction with the elements of car travel in downtown Seattle by trip purpose or based on time of day respondents' travel.

Respondents from the Bus Cluster sample have a positive overall impression of downtown Seattle. In all, 82% said their recent experiences in downtown Seattle left them with a "somewhat" or "very" positive impression while just 9% said their overall impression was "very" or "somewhat negative" See Figure 20A.

(Base = 367)



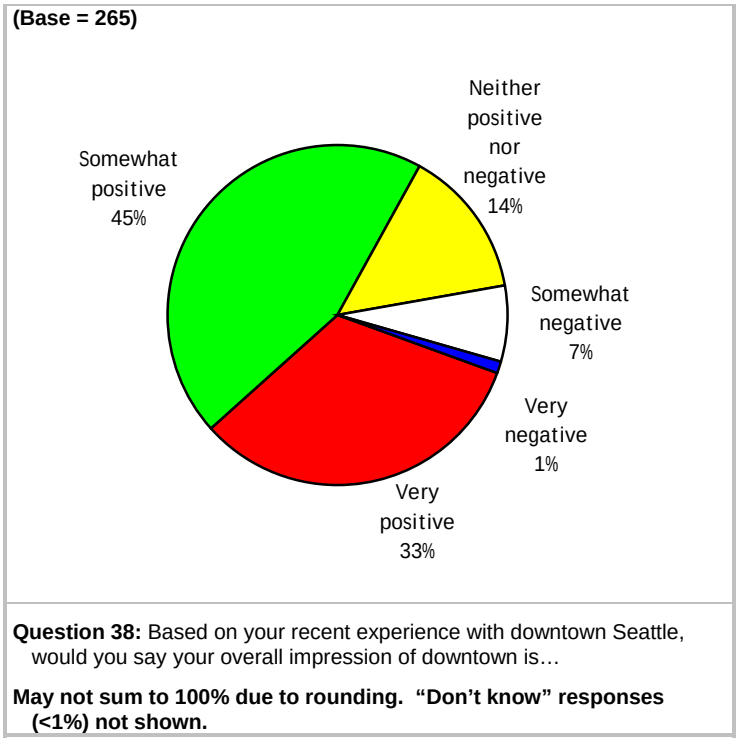
Question 38: Based on your recent experience with downtown Seattle, would you say your overall impression of downtown is…

May not sum to 100% due to rounding. "Don't know" responses (<1%) not shown.

Figure 20A. Overall Impression of Downtown Seattle *(All Bus Cluster respondents)*

Respondents from the Garage/Lot Cluster sample have a positive overall impression of downtown Seattle. In all, 78% said their recent experiences in downtown Seattle left them with a "somewhat" or "very" positive impression while just 8% said their overall impression was "very" or "somewhat negative". See Figure 20B.

Figure 20B. Overall Impression of Downtown Seattle ***(****All Garage/Lot Cluster respondents)*



Question 38: Based on your recent experience with downtown Seattle, would you say your overall impression of downtown is…

May not sum to 100% due to rounding. "Don't know" responses (<1%) not shown.

Respondents with a negative impression of downtown Seattle were less likely than average to visit downtown Seattle three or more times a month (29% negative impression v. 7% among regular downtown visitors).

Conclusions

Survey results show that, for the most part, how one travels to downtown Seattle has little influence over perceptions of the downtown experience. Respondents who ride the bus and those who drive or carpool to downtown, have a generally positive impression of the City. They don't feel crowded when they walk around downtown Seattle and are satisfied with their personal security and safety.

Travel mode makes little difference with regard to the time of day respondents' travel or how quickly they reach their destinations.

Bus riders are more satisfied with the elements of bus travel than drivers and carpoolers are with the elements of traveling by car. The cost and availability of downtown parking are particularly troublesome for car travelers. It will be interesting to see if the disparity in satisfaction between these two groups widens once the tunnel is closed and buses are re-routed to the surface streets.

Measure 6: Transportation Demand Management Program

Monitoring Objectives

The Transportation Demand Management (TDM) programs that will be implemented to support the Downtown Tunnel Closure from 2005-2007 have been designed to support the following objectives:

- Retain existing users of alternative travel modes (transit, biking, walking, rideshare) through enhanced products and programs.
- Attract new users to alternative travel modes by broadening program reach to individuals and small employers.
- Provide a supportive operating environment for alternative modes.

The TDM evaluation effort is designed to address the following:

- Assess the effectiveness of the TDM program in retaining existing users of alternative travel modes
- Determine if the TDM mitigation efforts resulted in new users of alternative travel modes
- Assess which programs were most attractive to the marketplace

Methodology

The TDM program funded by the M&M program is comprised of nine distinct TDM programs. Four are existing programs, to which new incentives/enhancements have been added for the period of tunnel closure. Three are new programs that have been created to attract new users or retain users of alternative travel modes. Two are new programs designed to support an operating environment that will increase the attractiveness of alternative modes. The programs are summarized below, in the baseline data section, along with the indicators that will be used to track performance.

The relevant use statistics associated with each TDM program will be collected and reported. Baseline data was compiled in May 2005, prior to the bus tunnel closure. After the launch of the new or expanded TDM programs, data will be collected quarterly and reported on a semi-annual basis, through September 2007.

The Downtown Transportation Alliance(DTA) is a forum that was created by the Downtown Seattle Association, the City of Seattle, and King County Metro to discuss downtown transportation issues. The DTA will be conducting an annual transportation survey of downtown commuters, beginning in winter 2005. The DTA survey will be the vehicle for assessing mode shift over the course of the tunnel closure period, and by inference, the effectiveness of the TDM program and other related mitigation measures. The initial survey has been completed and the results should be forthcoming.

Baseline Data

Figure 21 summarizes the baseline information for the TDM program. Two of four planned telecommute workshops surrounding the tunnel closure occurred in June 2005. Both workshops were well-attended and received media coverage. The remaining workshops will take place in September and October 2005. Plan Your Commute sessions will begin September 19th and last for six weeks.

Figure 21. Baseline TDM Conditions

Existing Programs with Enhancements	**Indicator**	**Baseline Numbers**
PugetPass Consignment	# of Consignment employers - employees	77 - 4545
Flexpass	# of Flexpass accounts - users	129 - 8330
Rideshare	# of Rideshare accounts - users	1451 - 3713
Flexcar	# of Flexcar accounts	4523
New Programs to increase and retain users of alternative travel modes	**Indicator**	**Baseline Numbers**
Home Free Guarantee for Individuals	# of HFG for Individual accounts - users	N/A
Plan Your Commute	# of Plan Your Commute participants	N/A
Telecommute	# of Telecommute Workshops – Percent share of companies in Seattle CBD offering telecommute for employees	2 - 10%
New Programs to support the operating environment for alternative modes	**Indicator**	**Baseline Numbers**
Bicycling	# of Bike Workshop participants	N/A
Shopper Incentives	# of Retail Participants - Coupons redeemed	N/A